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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

OH, TAYLOR V

ART UNIT PAPER NUMBER

1625

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/964,849

Applicant(s)

ELLIS ET AL

Examiner

Taylor Victor Oh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-26 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 28 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Final Rejection

The Status of Claims

Claims 1-26 are pending.

Claims 1-26 have been rejected.

Claim Rejections-35 USC 112

The rejection of Claims 1-3 and their dependent claims, and 5 under 35 U.S.C. 112, second paragraph, has been maintained due to applicants' failure to modify in the claims.

In claim 5, the phrase " a process as claimed in claim 4 1, 2 or 3 " is recited. It is unclear as to what claim 5 is dependent upon. Appropriate correction is required.

Claim Rejections-35 USC 103

1. Applicants' argument filed 2/28/05 have been fully considered but they are not persuasive.

2. Rejection of Claims 1, 4, 7, 11-26 under 35 U.S.C. 103(a) as being unpatentable over McCain, Jr. et al (U.S. 5,162,578) in view of Manyik et al (U.S. 4,899,003).

Rejection of Claims 2, 3, 5, 6, and 8-10 under 35 U.S.C. 103(a) as being unpatentable over Fisher et al (U.S. 3,458,406) in view of Manyik et al (U.S. 4,899,003).

The rejection of claims 1, 4, 7, and 11-26 under 35 U.S.C. 103(a) as being unpatentable over McCain, Jr. et al (U.S. 5,162,578) in view of Manyik et al (U.S. 4,899,003) is maintained with the reasons of the record on 8/30/04.

The rejection of claims 2, 3, 5, 6, and 8-10 under 35 U.S.C. 103(a) as being unpatentable over Fisher et al (U.S. 3,458,406) in view of Manyik et al (U.S. 4,899,003) is maintained with the reasons of the record on 8/30/04.

In Response to the Argument

3. The applicants argue the following issues:
 1. The McCain is not interested in ethylene as a product ; the McCain states that US 4,524,236 does not suggest mixed catalyst compositions for selective acid production; the McCain does not suggest that the ratio of ethylene to acetic acid in the product stream may be adjusted by controlling the concentration of ethylene in the feed ;
 2. The Manyik has no ethylene in the initial feed, only ethane and does not suggest that that the ratio of ethylene to acetic acid in the product stream may be adjusted by controlling the concentration of ethylene in the feed; the Manyik states that the preferred catalysts for use are disclosed in US 4,524,236 ;

3. The combined teachings of McCain and Manyik would not have been motivated to arrive at the current invention since McCain is directed to the production of only acetic acid, whereas Manyik is directed to the production of both acetic acid and ethylene; Manyik teaches the removal of water as a way to adjust the distribution of the production of products in favor of ethylene at the expense of acetic acid; Even if the skilled artisan did choose to add additional water, greater selectivity to acid may or may not be obtained in McCain because the nature of the catalyst in McCain is different to that of Manyik;
4. One of ordinary skill would not have been motivated to combine Manyik and Fisher since each of them relates to completely different technical fields;
5. Even if Manyik and Fisher were combined, the Manyik is completely silent adjusting the ratio of ethylene to acetic acid through control of the concentration of alkene in the feed;
6. The combined teachings of Manyik and Fisher would not have been motivated to arrive at the current invention since there is no disclosure of an alkane and alkene oxidation reaction in Fisher.

The applicants' argument have been noted, but these arguments are not persuasive.

First, with regard to the first argument, the Examiner has noted applicants' argument. However, on the contrary to applicants' assertion, regardless of having an interest in ethylene as a product, the McCain reference does teach that " the catalytic oxydehydrogenation of ethane to ethylene as the major product of the reaction and the oxidation of ethylene to produce acetic acid are known reactions" (see col. 3 ,lines 49-52). Furthermore, In Ex. 1 (see col. 11 ,lines 35-47) , the selectivity to acetic acid from ethane or the selectivity to ethylene from ethane can be changed by manipulating the choice of catalyst compositions.

Regarding the lack of teaching mixed catalyst compositions in US 4,524,236 for selective acid production, on the contrary to applicants' assertion, the McCain reference does indicate that the catalyst composition containing $\text{Mo}_{0.7} \text{V}_{0.25} \text{Nb}_{0.002} \text{Sb}_{0.01} \text{Ca}_{0.01}$ and powdered LZ-105 catalyst shown in US 4,524,236 can be selected for acetic acid from ethane (63 mole %).

Also, according to Ex. 2 (see col. 11, lines 55-66) , the oxidation of ethylene alone was carried out; the gas feed introduced into the reactor was made of 8% ethylene. The selectivity to acetic acid from ethylene was 74 mole percent. From this , it becomes clear that ethylene is not an optional one, but also a required feed component . Furthermore, it is quite possible that the ratio of ethylene to acetic acid in the product stream may be adjusted by controlling the concentration of ethylene in the feed. Therefore, the McCain reference is still relevant to the claimed invention .

Second, regarding the second argument, the Examiner has noted applicants' argument. However, on the contrary to applicants' assertion, McCain, Jr. et al does point out that either of ethylene or ethane can be used in the process of producing acetic acid; oxygen can be introduced into a gaseous stream containing ethane and

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possibly ethylene at a temperature of less than 250 °C (see col. 4 ,lines 31-35).

Also, Manyik et al expressly indicates the importance of controlling the molar ratio of alkene to carboxylic acid during the process in the following passages (see col. 3 ,lines 10-18):

The mole ratio of ethylene to acetic acid defines the relative yield of these products. It will be described herein, process steps for changing this ratio for use in a commercial viable process according to the invention. Thus, a commercial process can be carried out to favor the production of ethylene at the expense of acetic acid or to favor the production of acetic acid at the expense of ethylene.

In addition, both processes can be employed to produce acetic acid either by choosing ethane or ethylene. Therefore, the Manyik reference is still relevant to the claimed invention.

Third, concerning the third argument, the Examiner has noted applicants' argument. However, applicants have not shown that the catalyst disclosed in McCain, Jr. et al is not going to work for the Manyik et al process or vice-versa; therefore, either catalyst would work on both processes. Also, regardless of arriving at the current invention, there is a motivation to combine the two references. Manyik et al does teach the use of ethane in the process of producing ethylene and acetic acid, whereas McCain, Jr. et al does point out that of either ethylene or ethane in the process of producing acetic acid. Both processes can be employed to produce acetic acid either by choosing ethane or ethylene using similar catalyst compositions such as Mo_a V_b Nb

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$c Sb_d Ca_x$ shown in US 4,524,236. Furthermore, the Manyik et al does indicate that the addition of water to the input gaseous stream of each stage results in the high acetic acid selectivity with reducing the low ethylene selectivity. Therefore, it would have been obvious to the skillful artisan in the art to have motivated to incorporate the teachings of Manyik's et al ethane and addition of water to each stage into the McCain, Jr. et al process of producing acetic acid, thereby increasing the productivity of acetic acid.

Fourth, concerning the fourth argument, the Examiner has noted applicants' argument. However, on the contrary to applicants' assertion, The Manyik et al is directly related to the process of producing intermediate compounds, such as ethylene and acetic acid, whereas the Fisher et al has focused the production of the final products, alkyl carboxylate and alkenyl carboxylate by using those ethylene and acetic acid intermediates. They are in a relationship between the intermediates and the final products. Therefore, if the skilled artisan in the art had desired to extend from the process of ethylene and acetic acid to that of producing both alkyl carboxylate and alkenyl carboxylate, it would have been obvious to the skillful artisan in the art to have motivated to incorporate the teachings of Manyik's et al into the Fisher et al process. This is because the skilled artisan in the art would expect the combined processes to be successful as shown in the Fisher et al process.

Fifth, regarding the fifth argument, the Examiner has noted applicants' argument.

However, Manyik et al expressly indicates the importance of controlling the molar ratio of alkene to carboxylic acid during the process in the following passages (see col. 3 ,lines 10-18):

The mole ratio of ethylene to acetic acid defines the relative yield of these products. It will be described herein, process steps for changing this ratio for use in a commercial viable process according to the invention. Thus, a commercial process can be carried out to favor the production of ethylene at the expense of acetic acid or to favor the production of acetic acid at the expense of ethylene.

Furthermore, Fisher et al does teach at least the process of preparing vinyl acetate by reacting ethylene with acetic acid in the presence of the reduction-oxidation catalyst (see col. 1 ,lines 29-31) . Moreover, they are in a relationship between the intermediates and the final products. Thus, it is quite possible that, in order to produce vinyl acetate prepared by reacting ethylene with acetic acid, the ratio of ethylene to acetic acid in the product stream may be adjusted by controlling the concentration of ethylene in the feed in the following passages (see col. 3 ,lines 10-18).

Sixth, concerning the sixth argument, the Examiner has noted applicants' argument. However, Manyik et al does teach the disclosure of an alkane and alkene oxidation reaction and the process of producing ethylene and acetic acid by reacting ethane and oxygen in the presence of the catalyst system. Also, Fisher et al does teach the process of separating methyl acetate and ethyl acetate from vinyl acetate prepared by reacting ethylene with acetic acid in the presence of the reduction-oxidation catalyst. Regardless of arriving at the current invention , there is a motivation

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to combine the two references. The Manyik et al is directly related to the process of producing intermediate compounds, such as ethylene and acetic acid, whereas the Fisher et al has focused the production of the final products, alkyl carboxylate and alkenyl carboxylate by using those ethylene and acetic acid intermediates. They are in a relationship between the intermediates and the final products. Therefore, if the skilled artisan in the art had desired to extend from the process of ethylene and acetic acid to that of producing both alkyl carboxylate and alkenyl carboxylate, it would have been obvious to the skillful artisan in the art to have motivated to incorporate the teachings of Manyik's et al into the Fisher et al process. This is because the skilled artisan in the art would expect the combined processes to be successful as shown in the Fisher et al process.

Therefore, the Examiner maintains the rejection of all the claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*** Taylor Victor Oh
5/25/55

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